

This listing of claims will replace all prior versions
and listings of claims in the application:

LISTING OF CLAIMS

-1-(Currently Amended)

A process for producing heteroepitaxial
growth of a single crystal diamond film which
comprises:

5 (a) forming an atomically flat stepped
surface on a single crystal metal oxide substrate which
has a crystal structure for depositing a film of
epitaxial iridium to produce a (001) film on the
surface;

10 (b) depositing the film of the epitaxial
iridium metal on the metal oxide so that the (001)
surface results;

15 (c) depositing by chemical vapor deposition
(CVD) of diamond nuclei onto the iridium film on the
substrate, which is mounted on a holder for the
substrate which holder has a negative bias and which
holder comprises an insulating shield and a cap in the
plasma, wherein the diamond nuclei emerge from a plasma

produced from a mixture comprising methane and hydrogen
gases with dc-biased ion bombardment onto the iridium
film ~~from the gases~~; and

(d) growing the diamond film on the diamond
nuclei condensate and iridium film using CVD and the
mixture of the methane and the hydrogen, without the
dc-biased ion bombardment to form the single crystal
diamond.

-2-(Original)

The process of Claim 1 wherein in step a) the
metal oxide substrate is selected from the group
consisting of sapphire, strontium titanate, lanthanum
aluminate and magnesium oxide.

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-3-(Original)

The process of Claim 1 wherein in step a) the
atomically flat surface is provided by chemical,
mechanical or thermal means.

-4-(Original)

The process of Claim 1 wherein the d.c. bias is between -100 and -300 volts relative to a bias ring located within the plasma above the substrate.

-5-(Original)

The process of any one of Claims 1, 2, 3 or 4 wherein the microwave frequency is between 900 MHz and 2.5 GHz, the methane to hydrogen ratio is between 0.002 and 0.04, and the temperature is between about 650 and 850°C.

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-6-(Original)

The process of Claim 1 wherein the substrate is electrically isolated from a support during the CVD.

-7-(Original)

The process of any one of Claims 1, 2, 3 or 4 wherein the gases are essentially free of nitrogen.

-8- (Currently Amended)

A process for producing a composite composition which comprises:

(a) forming atomically flat stepped surface on a single crystal metal oxide which has a crystal structure for depositing a film of epitaxial iridium to produce a (001) film on the surface;

(b) depositing the film of epitaxial iridium metal on the metal oxide surface so that the (001) surface results; and

(c) depositing diamond nuclei on the iridium film by chemical vapor deposition (CVD) from a plasma produced from a mixture comprising methane and hydrogen gases with dc-biased ion bombardment onto the iridium film on the substrate, which is mounted on a holder for the substrate which holder has a negative bias and which holder comprises an insulating shield and a cap in the plasma, from the gases to produce the composite composition.

-9- (Original)

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The process of Claim 8 wherein the substrate is sapphire.

-10-(Original)

The process of Claim 8 wherein the dc bias is between -100 and -300 volts relative to a bias ring located in the plasma above the surface.

-11-(Original)

The process of any one of Claims 8, 9 and 10 wherein the microwave frequency is between 900 MHz and 2.5 GHz, the methane to hydrogen rate is between 0.002 and 0.04 and the temperature is between 650 and 850°C.

-12-(Original)

The process of Claim 1 wherein the substrate is electrically isolated during the CVD.

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-13-(Currently Amended)

The process of any one of Claims 8, ~~9~~ 10 or
12 wherein the gases are essentially free of nitrogen.

Claims 14-17 (Cancelled)